

1 We claim:

1 1. A global positioning system receiver for performing both navigation and  
2 correlation functions, comprising:

- 3 (a) a radio frequency down converter;
- 4 (b) a programmable digital signal processor;
- 5 (c) a navigation processing unit in communication with and residing within  
6 said programmable digital signal processor for performing navigation functions;
- 7 (d) a signal processing unit in communication with and residing within said  
8 programmable digital signal processor for performing signal correlation;
- 9 (e) a sampling clock connecting said radio frequency down converter to the  
10 programmable digital signal processor,

11 whereby the integration of the navigation and correlation functions in the programmable  
12 digital signal processor obviates the need for a separate hardware correlator, the power  
13 consumption is reduced as a result of a fewer number of hardware components, and the  
14 ability to change the sampling frequency by programming the digital signal processor  
15 chip enables the programmable digital signal processor to interface with any type of the  
16 radio frequency down converter.

1

2 2. The global positioning system receiver of claim 1, further comprising:

- 3 (a) a real time clock connected to said programmable digital signal processor  
4 for improving time for first fix;
- 5 (b) a serial electrically erasable programmable read only memory connected  
6 to the programmable digital signal processor; and
- 7 (c) a software driver connected to the programmable digital signal processor;

8

1 3. The global positioning receiver of claim 1, wherein said signal processing unit  
2 comprises:

- 3 (a) a correlator for generating correlation values by simultaneously  
4 performing signal acquisition and tracking;

- 5 (b) a correlator manager connected to said correlator for generating
- 6 pseudorange and Doppler measurements and extracting navigation messages;
- 7 (c) a channel manager connected to the correlator for assigning channels in
- 8 the correlator;
- 9 (d) a measurement data processor connected to said correlator manager for
- 10 validating the measurement data through the filtering of pseudorange and Doppler
- 11 measurements; and
- 12 (e) a satellite database manager connected to and in communication with the
- 13 correlator manager for maintaining the database of navigation messages processed
- 14 by the correlator manager in the global positioning receiver.

1

2 4. The global positioning receiver of claim 1, wherein said navigation processing  
3 unit comprises:

- 4 (a) a host communication module for communicating with the host through a
- 5 software driver link;
- 6 (b) a user position computation module connected to said host communication
- 7 module for obtaining the position, velocity and time by receiving the
- 8 measurements from said measurement data processor;
- 9 (c) a satellite position computer module connected to user position estimation
- 10 module for computing the position and velocity of the satellites;
- 11 (d) a satellite visibility computation and satellite selection module connected
- 12 to said channel manager for generating the list of visible satellites required by
- 13 said channel manager, based on the position estimates;
- 14 (e) a non-volatile memory module connected to said satellite visibility
- 15 computer module for managing the data in said real time clock of said electrically
- 16 erasable programmable read only memory.

1

2 5. The global positioning system receiver of claim 1, wherein said radio frequency  
3 down converter is connected to and in communication with a low cost frequency crystal  
4 of low stability, whereby the flexible programmability of the digital signal processor  
5 maintains high performance notwithstanding the use of said low cost frequency crystal of  
6 low stability.

1

2 6. The global positioning system receiver as in claim 1, further comprising a  
3 programmatic interface for providing the capability to integrate new applications on the  
4 digital signal processor, whereby the need for additional microcontrollers is obviated.